United States Patent [19]

Grogg, Sr.

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[54] **AMUSEMENT VEHICLE**

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[51] **Int. Cl.**[2] **A63H 17/04**

[52] **U.S. Cl.** **46/219**; 124/82

[58] **Field of Search** ..... 46/202, 219, 1 E; 124/49, 50, 82

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Assistant Examiner—Mickey Yu

[57] **ABSTRACT**

A toy tank is disclosed having tracks and a cannon supported on a turret. The tracks consist of multi-element, hingeable links forming a chain type loop supported by tensioned rollers and idlers such that the tracks are articulated realistically in accordance with the contours of the surface on which the tank travels. The turret carries a cannon for dispensing bullet-like projectiles in a realistic fashion. Atop the turret is a projectile containing and feeding mechanism which automatically loads the breech of the cannon when the cannon ram rod or plunger is fully withdrawn therefrom in order that same is cocked for the next firing sequence.

10 Claims, 9 Drawing Figures

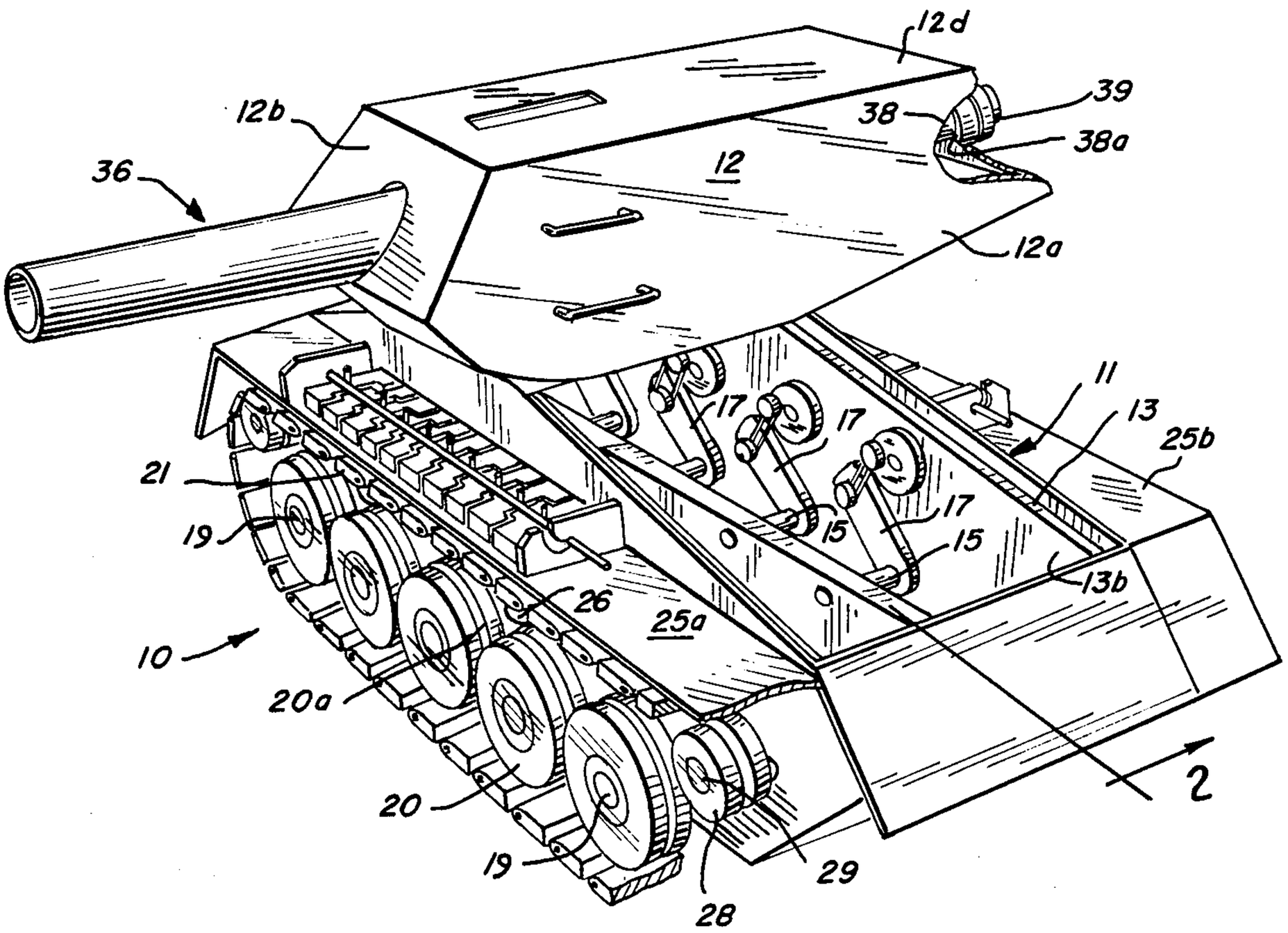

FIG. 1

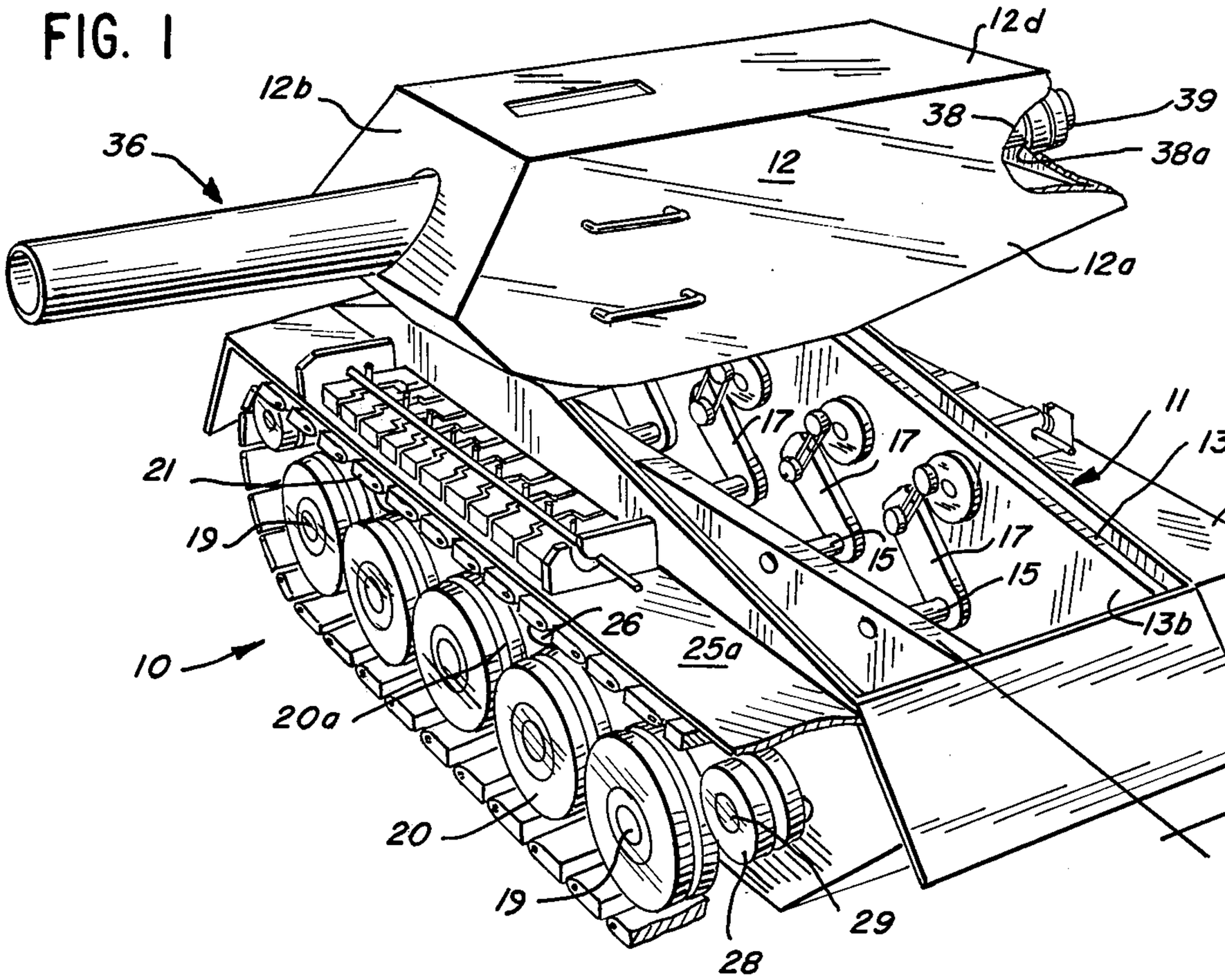
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FIG. 2

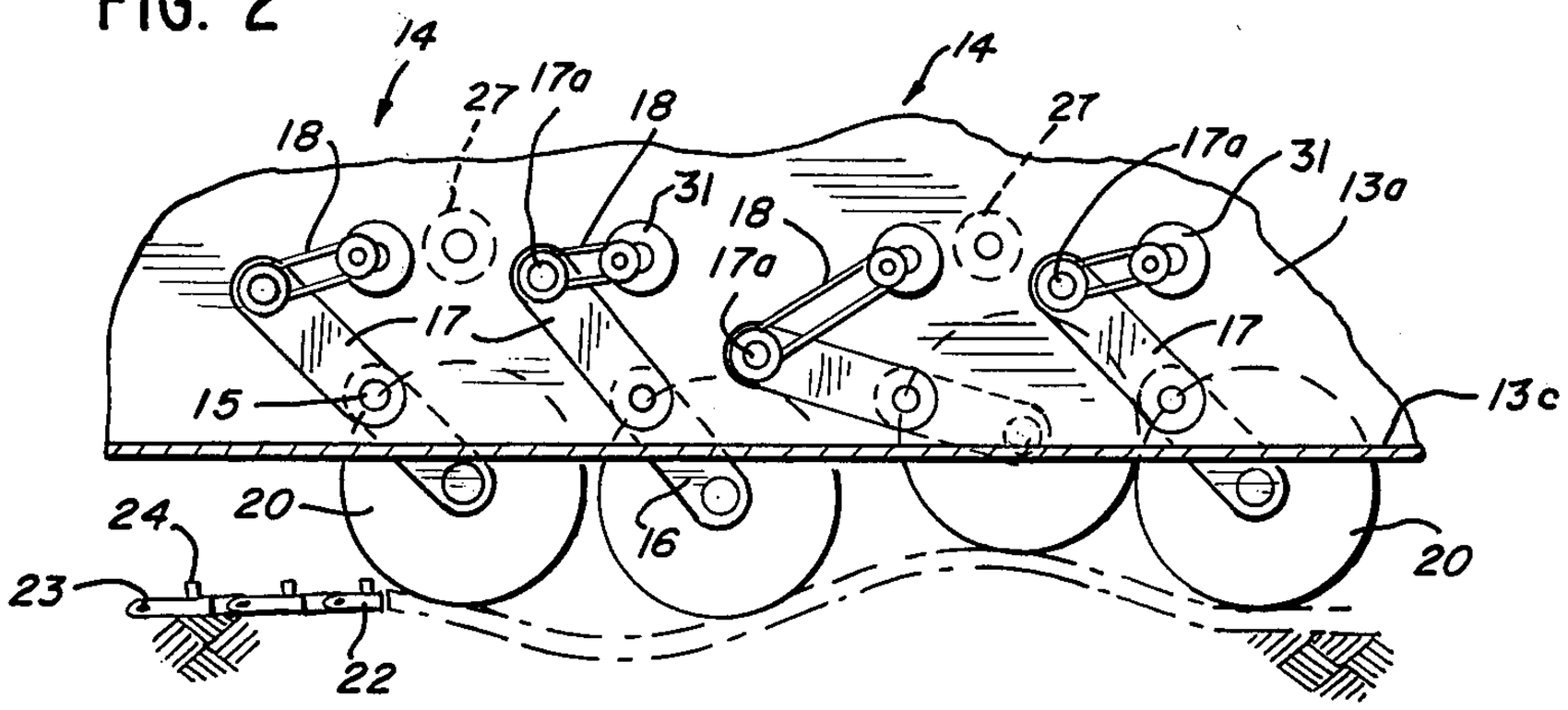
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FIG. 3

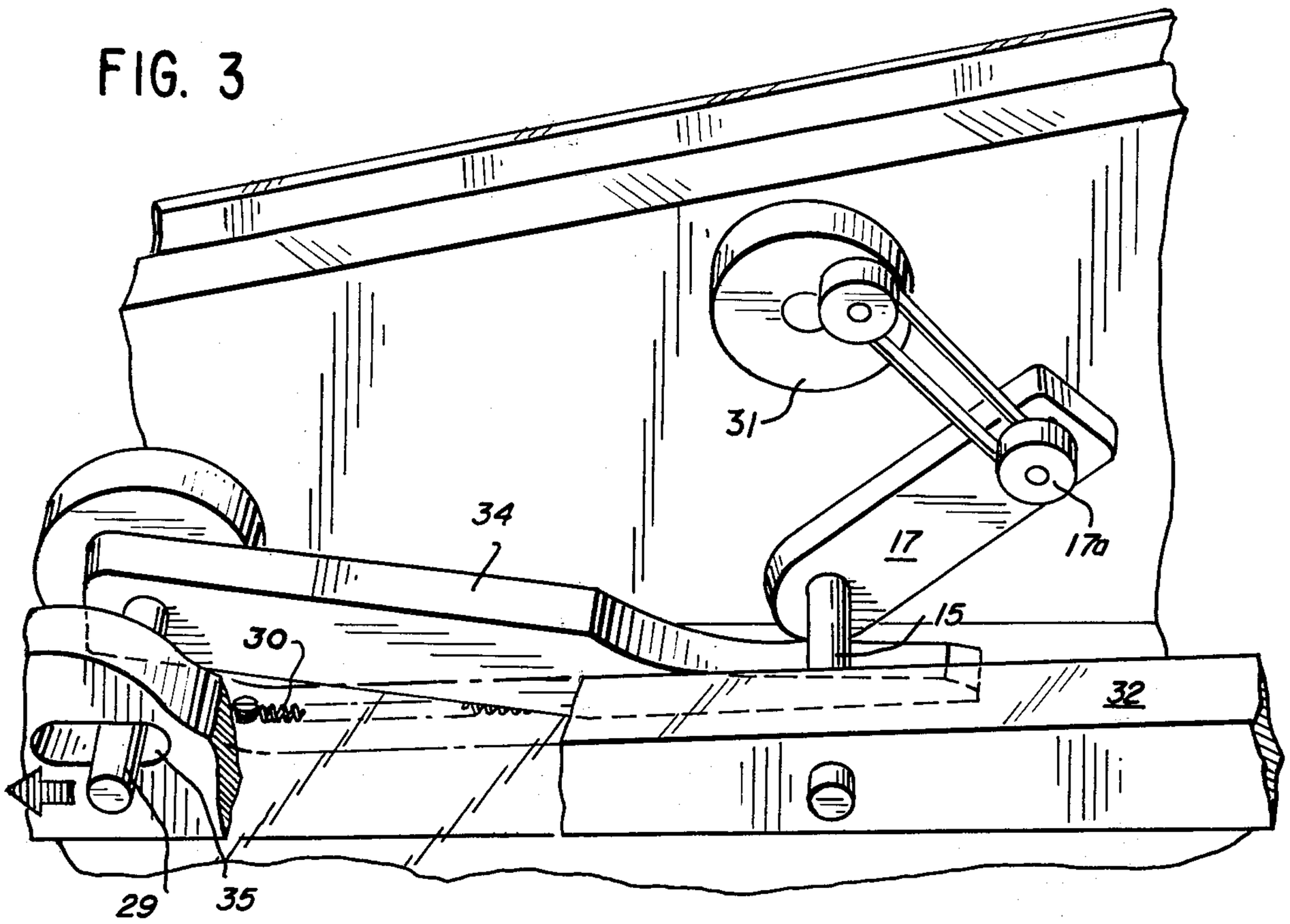


FIG. 4

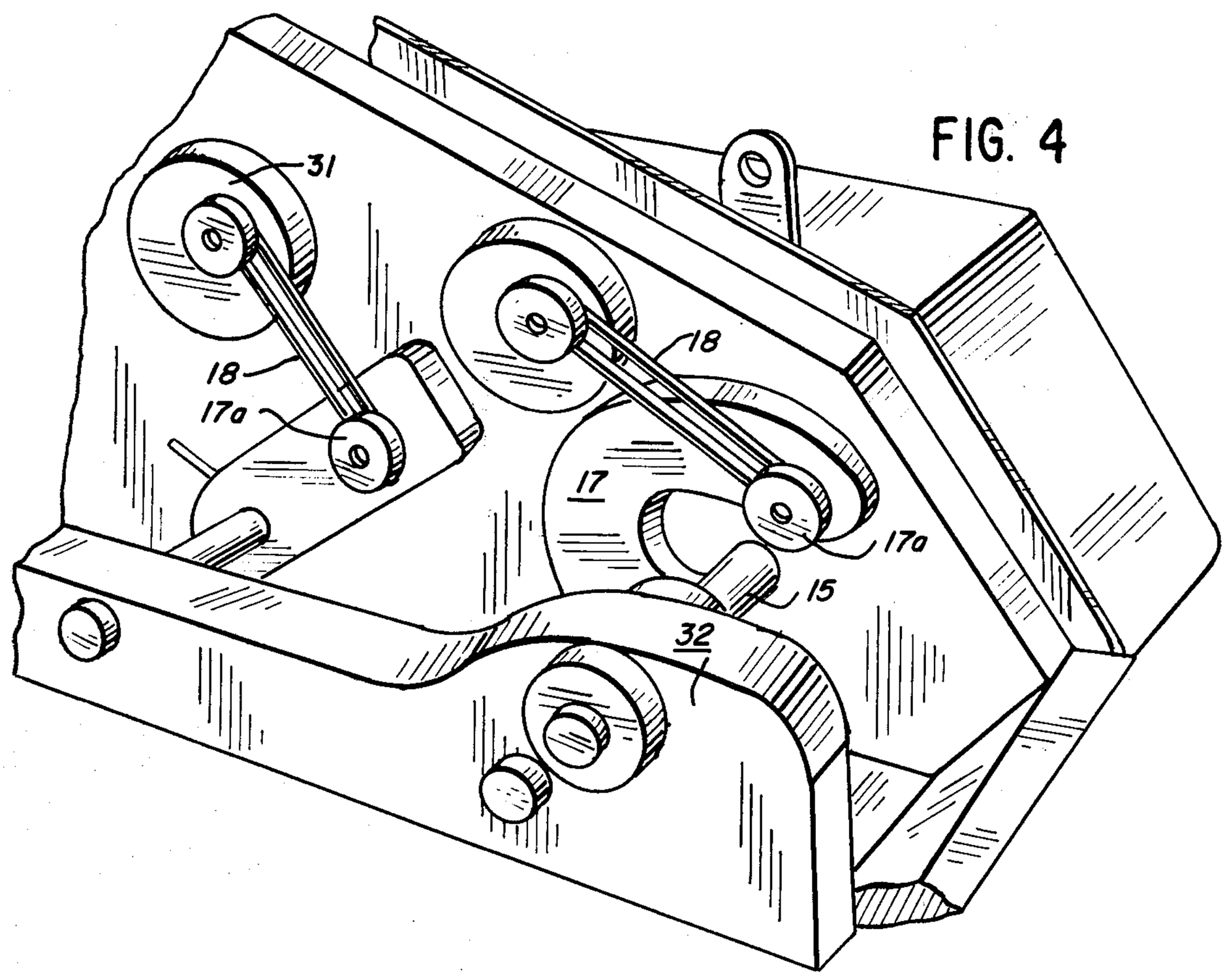


FIG. 5

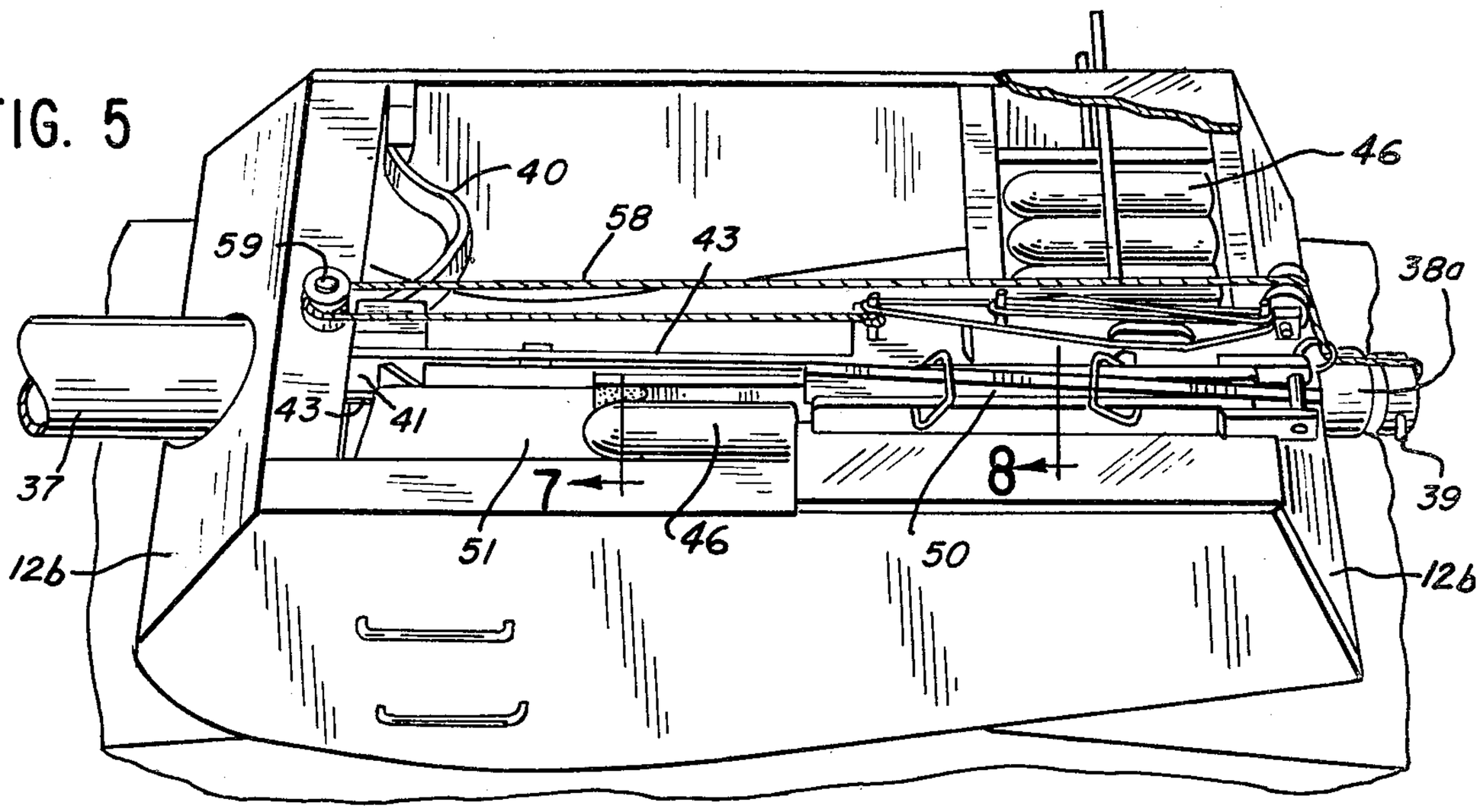
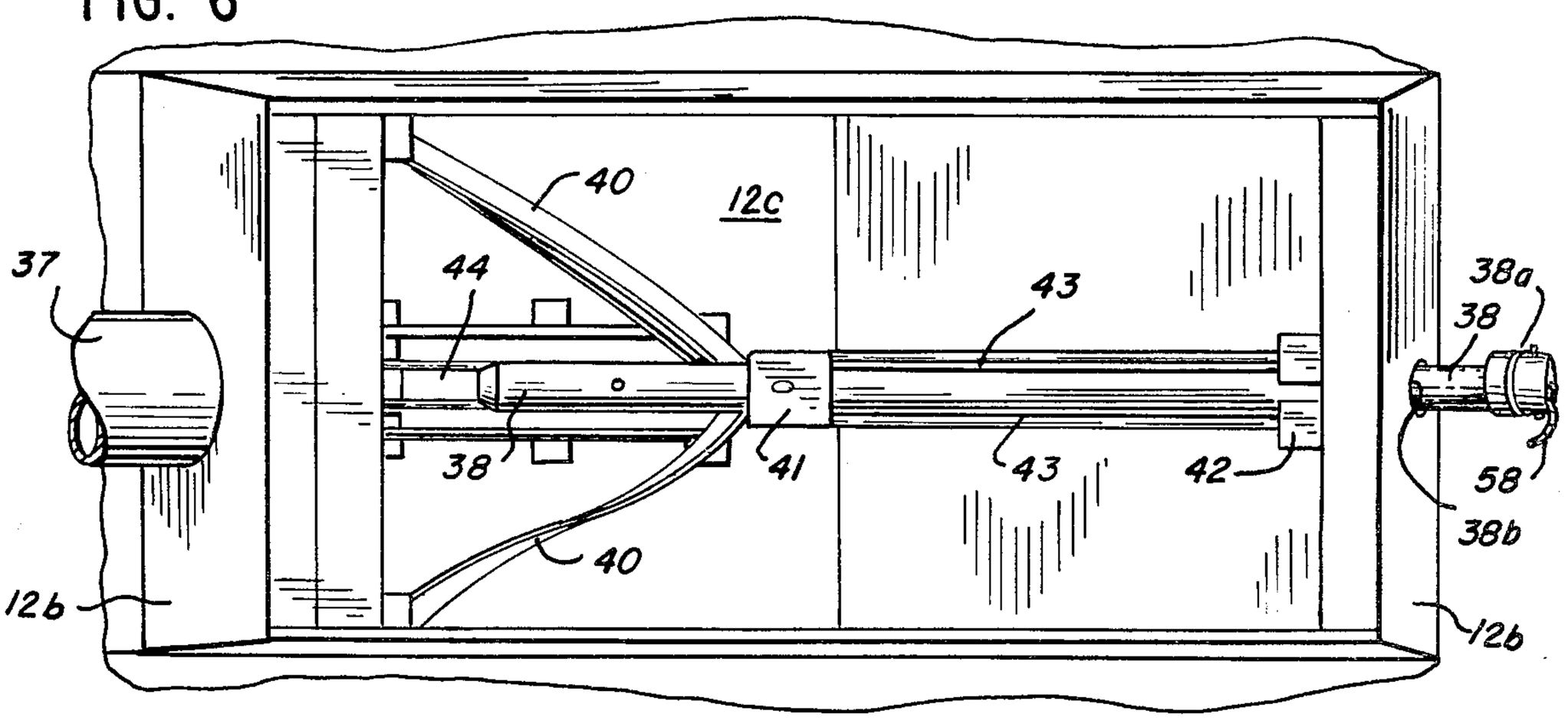


FIG. 6



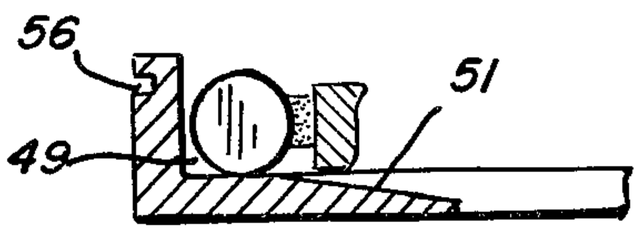


FIG. 7

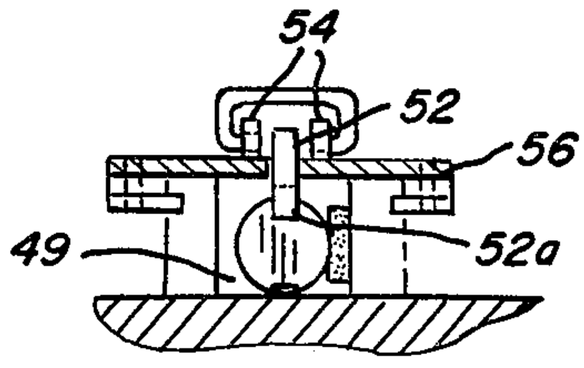
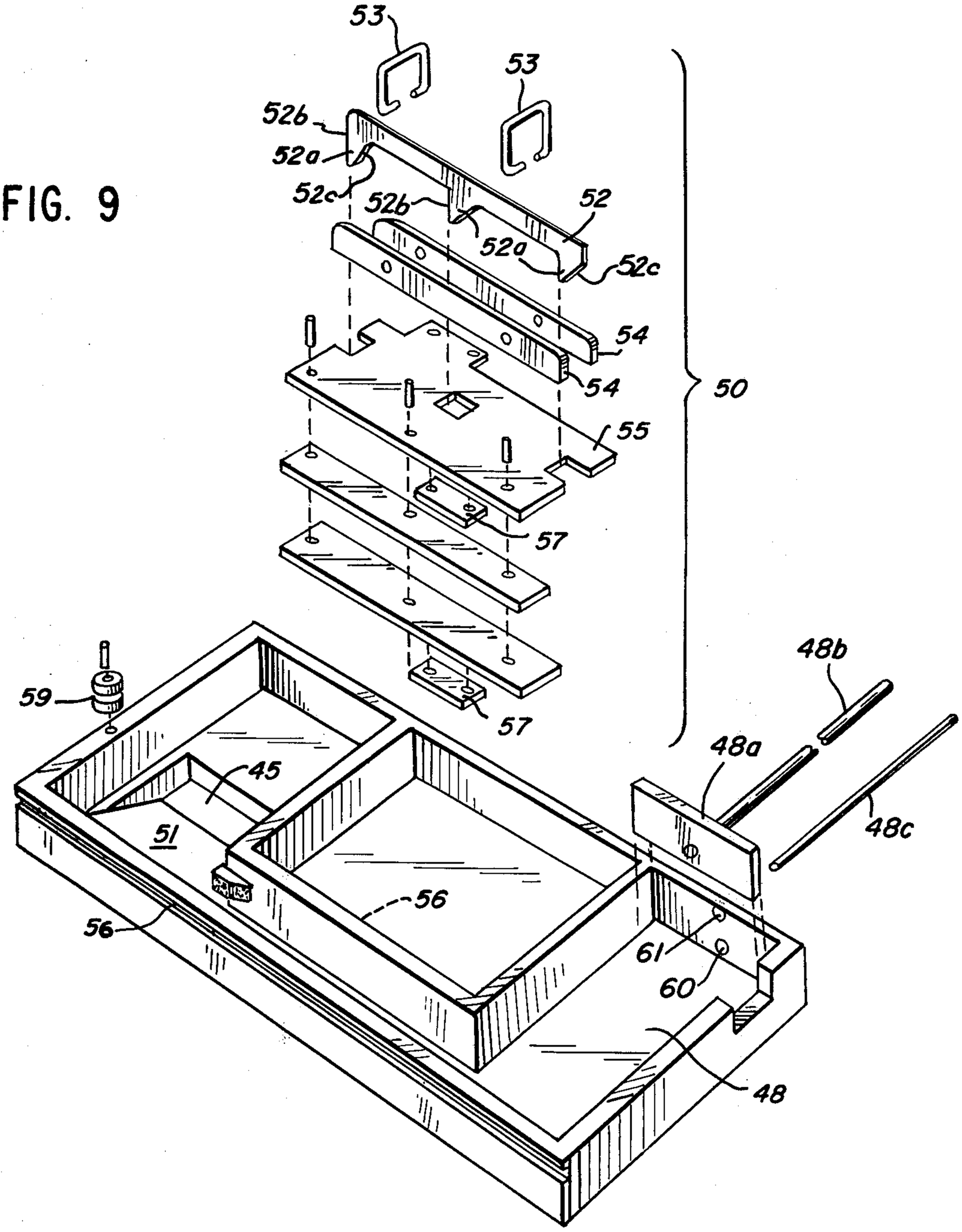


FIG. 8

FIG. 9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AMUSEMENT VEHICLE

BACKGROUND OF THE INVENTION

This invention relates to toy tanks having turrets and cannons and more particularly such tanks which include articulated track members for movably supporting same in a realistic fashion. Known toys with tracks such as toy tanks, tractors or the like having track type support members generally include reversed rubber cog belts which convey the idea but are not accurate representations of actual track mechanisms either in terms of function or performance in operation. Similarly, such track type tanks rarely include a pivotable turret with an automatic feeding and dispensing system for projectiles.

It is therefore an object of the invention to provide a toy tank with a pivotable turret which includes an articulated multi-element track system that is able to follow the contours of the surface terrain.

Moreover it is a further object of the invention to provide a toy tank with a turret that includes an automatic projectile containing and feeding system which operates to load the breech of the cannon when same is cocked.

A still further object of the invention is to provide a realistic toy cannon which functions in a realistic manner thereby stimulating the user's imagination.

SUMMARY OF THE INVENTION

The aforesaid realism is achieved by a toy tank which includes an articulated multi-element track system and a projectile containing, feeding and dispensing system. The tank has a chassis with a generally hollow body portion supporting for pivotal movement an upper turret portion. The body portion has a top flat turret platform and depending spaced parallel walls which carry the suspension means for the track system. Through the mid-portions of the walls are a series of pivotable pins which support for parallel swinging movement against the outside of the walls trailing arms on the lower ends of each are axles for rotatable rollers. Mounted above the pivot pins along the upper portions of the walls are idlers carried for rotatable movement about their axes. Two tracks carry the toy tank by forming elongated chain loops about the idlers and rollers. To tension the tracks the roller pivot pins are biased by inner arms which extend parallel to the inside of the walls; these arms are pivotable about the axis of their pins and are urged by resilient members to cause the rollers to engage their respective tracks. The rearmost idlers on each wall are adapted to remove any slack in the track chain loops caused by variations in the contours against which they run by biasing the upper portions of each track.

The turret carries a cannon and an automatic containing and feeding system for the projectiles to be dispensed through the cannon. The cannon bore mates with a plunger having a companion crossection. The plunger is fully cocked slightly beyond the breech of the bore and it is the movement of the plunger that is used to move the projectiles through the feeding and containing system to the breech of the cannon. Specifically, as the plunger is pulled to its cocked position, a cable connected between the plunger and a shuttling pawl draws the pawl and projectiles carried thereby toward the breech. Whereby the projectiles are moved from the containing portion of the system along a feeding channel to a ramp from where they roll into the breech. Release of the plunger will eject the breech loaded projectile through the cannon bore.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a perspective view of the rear side of the tank and turret with parts of the track suspension system shown in cut away,

FIG. **2** shows a partial and enlarged inside sectional view along lines **2—2** of FIG. **1**,

FIG. **3** shows an enlarged fragmentary perspective of the inside of the rear track tensioning and suspension system,

FIG. **4** shows an enlarged partial perspective of the front track suspension tensioning system,

FIG. **5** shows a partial perspective view of the feeding and containing system,

FIG. **6** shows a top view of the feeding and containing system,

FIG. **7** is a partial section along **7—7** of FIG. **5**,

FIG. **8** is a partial section along **8—8** of FIG. **5**, and

FIG. **9** is an exploded view of the feeding and containing system.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** shows a tank **10** which includes a hollow body **11** atop which is carried a pivotal turret **12**. The tank **10** includes chassis **13** which has a pair of upright walls **13***a* and **13***b*. Upon walls **13***a* and **13***b* is carried a suspension system **14** and more particularly extending through the upper portions of walls **13***a* and **13***b* are a series of pins **15** of cylindrical configuration which are normal to walls **13***a* and **13***b*. Connected to the outer end of each pin **15** is an outer arm **16** and connected to the inner end of each pin **15** is an inner arm **17**. Outer arms **16** extend in trailing relation relative to the direction of travel of the tank **10** and carry at their extreme lower end, opposite the end at which pin **15** is connected, a roller axle **19** about which rides a disc shaped roller **20** in substantially parallel relation to the walls either **13***a* or **13***b*. Inner arms **17** extend parallel to and juxtaposed with the insides of walls **13***a* or **13***b* and act as a moment arm to be resiliently biased thereby placing each pin **15** in torsion to bias outer arms **16** downwardly relative to the body **11**. As will be explained later the biasing is caused by resilient members **18** hooked between arms **17** and walls **13***a* or **13***b*. Consequently, rollers **20** carried on roller axle bearings **19** are biased downward to act as the prime elements of the suspension system **14** in carrying resiliently the weight of the tank **10**. Each roller **20** has a circumferential groove **20***a* which guides a track system **21**.

Each track system **21** is composed of a series of hingeably connected elongated track links **22**, see FIGS. **1** or **2**. The track links **22** are of interlocking configuration in that one side of each has a "C" shape which encloses an extending tab of an adjacent link within the mouth of the "C". Thus the adjacent links **22** interlock and cooperate by means of transversely disposed link hinge pins **23**. A series of links **22** are hinge connected end to end to form a closed loop chain which forms a track for one side of the tank **10**. Each link **22** is elongated such that its width to length ratio is approximately $2\frac{1}{2}$ to 1; the width being the distance between the adjacent parallel hinge pins **23**. The closed loop track system **21** forms a

flexible chain like member of adequate surface to support the tank **10**.

Extending inwardly from each track link **22** is a normally disposed cylindrical locating pin **24** for locating each track link **22** transversely relative to rollers **20**. That is to say that, each track locating pin **24** is positioned to align in the circumferential groove **20***a* as it passes a roller **20**. The track locating pins **24** are seen in FIG. **1** wherein an extra supply of hingeably connected track links **22** are stored on a track fender **25***a* horizontally extending above the track system **21** and normal to wall **13***a*, or similarly, on a fender **25***b* which extends normally from the upper side of wall **13***b*.

In order to maintain a taut condition in the track systems **21** against the tensioned rollers **20**, there are four spool shaped idlers **27** carried by the upper portion of each wall **13***a* and **13***b* in parallel relation. The front three idlers **27** are carried on outwardly extending axles **27***a* that are cantilever and normal to either the upper exterior side of wall **13***a* or **13***b*. The idlers **27** rotate freely about their respective axles **27***a*. Each idler **27** carries a circumferential groove **27***b* which cooperates with the track locating pins **24** in the manner described in connection with rollers **20** and each idler **27** is positioned in spaced relation relative to its adjacent idler so as to support the upper inside of its respective track system **21** from sagging and interferring with any roller arm **16** or any roller **20**.

At the rear upper inside corner of each track system **21** another spool like idler **28** is carried for horizontal longitudinal movement relative to tank **10**. Each rear idler **28** is supported for free rotary movement on a slidable rear axel pin **29** which rests in a longitudinal grooves disposed in the rear upper portions of either wall **13***a* or **13***b*. Axle pin **29** is tensioned rearwardly by resilient member **30** to keep constant pressure on the inside surface of track system **21** thereby relieving any tendency to sag or have slack in said system.

The techniques for biasing the rollers **20** and the rear idler **28** are best disclosed in FIGS. **2**, **3**, and **4**. For simplicity and low cost the resilient members **18** used for the rollers **20** are in the nature of flexible resilient loops such as rubber bands. It will be appreciated that any form of spring member can be used or adapted for use to bias the various components of the tank **10**. In the preferred embodiment as shown in FIG. **2**, the inner arms **17** are equipped with a knob **17***a* located at the end opposite the connection between arm **17** and pin **15**. Carried on the inner surfaces of either wall **13***a* or **13***b* are a series of adjustable supports **31** for resilient members **18**. Each support **31** is arranged for restrained pivotable movement on either wall **13***a* or **13***b*. That is to say that, the supports form an adjustable positionable locating means for one end of each resilient member **18**. The other end of the member **18** is hooked about the knob **17***a* whereby tension adjustment of resilient member **18** can be easily made by rotating the respective support **31**, see FIG. **2**. The operation of the tensioned rollers **20** are shown in FIG. **2** wherein the various resilient members **18** are extended in accordance with the load placed upon each roller **20** which is caused by the articulated conformation of the track system **21** with the terrain. Shown in FIG. **4** is a slightly modified roller tensioning system for the front roller **20**; it is necessary because of the limited space. More particularly, the inner arm **17** is "C" shaped such that the mouth of the "C" or curve clears the pin **15** of the front roller **20**. The pin **15** extends through and into the chassis **13** to the area between walls **13***a* and **13***b*. A floor **13***c* located between the bottoms of walls **13***a* and **13***b* supports a pair of longitudinal inside support walls **32** and **33** for walls **13***b* and **13***a* respectively, see FIGS. **1**, **3** and **4**. The purpose of walls **32** and **33** is primarily to locate the insidemost ends of pins **15** in order to overcome any cantilever loads which might be imposed upon them. Wall **32** is shown; a similar wall **33** which cooperates with the pins **15** that extend through the wall **13***a* is not shown, but is identical.

The tensioning means for one rear idler **28** is shown in FIG. **3** there is a similar system for both rear idlers **28**. More particularly, between inner wall **32** and the inside of wall **13***b* there is a slidable link or track tensioner **34** which at its rearmost end supports in bearing type fashion a sliding axle pin **29** for the rear idler **28**. A horizontal longitudinal slot **35** for the inner end of the sliding pin **29** is provided in the inner wall **32**. Slot **35** is similar in configuration to an equivalent slot in wall **13***b* (not shown) thus the sliding pin **29** is permitted to move and carry the track tensioner fore and aft with it when necessary. The track tensioner **34** is resiliently biased rearwardly in order to maintain constant tension in the track system **21** by a coil tension spring **30**. Spring **30** connects between bottom of the track tensioner **34** and the rear floor **13***c* of the chassis **13**. The track tensioner **34** is an elongated plate like link with a front tongue portion which is positioned for sliding beneath the pin **15** for the first roller **20** immediately in front of the rear idler. The tongue of the track tensioner **34** is provided to guide the tensioner in its movement fore and aft without allowing rotation. The rear idler **28** is constantly biased rearward and acts to remove the slack in the track system **21**; while not shown the tensioning system for the track which rides against wall **13***a* is identical.

In FIG. **1** the turret **12** is shown pivoted relative to the body **11**. The turret **12** is basically a hollow structure consisting of a pair of sides **12***a*, a front and a rear **12***b* and a floor **12***c*. Through the front wall **12***a* of the turret **12** is an aiming system **36** which consists of a gun barrel or cannon **37** and a plunger **38** of crossection compatable to the cannon bore rides therein and extends rearwardly through the turret **12** and out the rear **12***b*. The plunger **38** includes a plunger stop **38***a* which stops the plunger **38** in its forwardly most position against the rear wall **12***b*. The stop **38***a* consists of transverse peg **39** and a pair of washers which are resilient such that the stopping of plunger **38** is cushioned as it moves to its forwardmost position. Plunger **38** is connected between the inside of the turret **12** near the front **12***b* and the medial portion of the plunger by means of a resilient member **40** or rubber band. The interconnection of plunger **38** and member **40** is adjustable so that the plunger force is adjustable. That is to say that, an adjustable retainer **41**, being an elongated pin, cooperates with holes **38***b* positioned vertically along and through the mid portion of the plunger **38**. Whereby the location of retainer **41** can be shifted from one hole **38***b* to the next to adjust the tension as desired for varing the force for the plunger **38** in cannon **37**, see FIG. **6**.

A pair of "U" shaped supports **42** rest upon the floor **12***c* of the turret **12** and carry horizontally disposed plunger support rods **43** which longitudinally extend within the turret **12** from the inside of the turret front **12***b* to the inside of the turret back **12***b*. The rods **43** and "U" shaped supports **42** act to guide the plunger when it is withdrawn from the bore of the cannon **37** and is at its rearwardmost position. The plunger **38** forms an

opening inbetween it and the rear of the cannon **37** that opening is called the breech **44**. The breech **44** is located beneath a slot **45** that extends longitudinally and through the closure or top **12***d* of the turret **12**. Projectiles **46** which are brought into alignment with slot **45** are fed directly into the breech **44** if the plunger **38** is in its rearwardmost position and the breech **44** is open.

There is also a projectile feeding and containing system **47** adapted to be carried atop the turret closure **12***d* and in alignment with slot **45**. The feeding and containing system **47** is best shown in FIG. **1**; system **47** includes a magazine or shell container portion **48** and a shell transport slot or channel **49**. The channel **49** and the magazine **48** are in the same plane but are arranged normal to one another such that the frontmost shell in the magazine is aligned longitudinally with the rear end of channel **49**. A shuttle mechanism **50** is provided to move the projectiles **46** from the magazine through the channel **49** to a ramp **51**. Ramp **51** is inclined downwardly to deliver projectiles **46** into slot **45** and thus to breech **44** of the cannon **37**. The ramp **51** is inclined toward the slot **45** such that when the projectile **46** is feed by the shuttle mechanism **50** through the channel **49** and it reaches the front thereof; it hits ramp **51** and rolls down into the slot **45**.

The shuttle mechanism **50** includes a sliding pawl **52** which is adapted to ride within the center of channel **49**. The pawl **52** is arranged to move freely up and down relative to the channel **49**. Pawl **52** includes a pair of vertically spaced openings for controlling and containing projectiles **46** during movement (in a forward direction only) through the channel **49**, see FIGS. **7**, **8** and **9**. The foregoing is accomplished by means of angled teeth **52***a* that extend downwardly into the channel **49** and carry projectiles **46**. The front surface **52***b* of each tooth **52** is vertical and acts to push a projectile **46** while the rear surface **52***c* of each tooth **52** is inclined and acts to cam pawl **52** upwardly over the projectiles **46** when the pawl **52** is moved in a rearwardly direction. Pawl **52** can only move projectiles **46** in a forward direction. Pawl **52** is carried in an upright vertical position by a pair of wire bails **53** which are mounted on a pair of vertically disposed pawl guides **54**. Guides **54** are attached to a horizontal pawl plate **55** in a parallel spaced front to back relation for guiding the pawl **52** within the channel **49** and for permitting free up and down and controlled fore and aft movement of the pawl **52**. Bails **53** are pivotally carried on guides **54** to extend between them and over pawl **52**. Longitudinal grooves **56** are provided on the outsides of the walls of channel **49** for guiding the pawl plate **55**. More particularly, there are cooperating groove lugs **57** which engage the grooves **56** to assure that the pawl plate **55** rides in alignment with the channel **49**. Bails **53** connect to guides **54** by inwardly extending parts **53***a* which fit within holes in the pawl guides **54** such that the bails **53** are free to rotate about their ends **53***a*. In their most vertical position they permit the pawl **52** to move upwardly enough to clear the diameter of projectile **46** whereby the pawl can skip rearwardly across the projectiles **46** and can be aligned for dropping down and catching additional projectiles for movement of same forwardly in the channel **49**. Thus, in a shuttle fashion, the pawl **52** moves rearwardly to catch two projectiles (one already in the channel **49** and one at the forwardmost position in the magazine **48**) before moving same through the channel **49** to the ramp **51** for loading into the breech **44**. The projectiles **46** are contained in side to side relation in the magazine and are biased toward channel **49**. There is shown a pusher **48***a* and its associated drive handle **48***b* which extend through the side wall of the magazine **48** at the lower hole **60** therein shown. A retaining rod **48***c* shown in FIG. **9** extends through upper hole **61** across the top of magazine **48** above the projectiles **46** to retain them, see FIGS. **5** and **9**.

The movement of the shuttle is controlled by a cable **58** which is connected between the plunger and the shuttle plate **55** whereby the cable **58** is caused to pull the shuttle forward as the plunger **38** is drawn rearward for cocking. Thus, as the plunger **38** is cocked the shuttle moves forwardly to carry projectiles **46**, loaded in the magazine **48**, through the channel **49** to the ramp **51**. The cable **48** is aligned between the plunger **38** and the plate **55** by means of a cable pulley **59** mounted to the front of the feeding and containing system **47**, see FIG. **1**. Pulley **59** is carried for rotary movement about a vertical axis whereby the cable **58** extends forwardly from the plunger **38** around pulley **59** and then rearwardly to the leading edge of the pawl plate **55** thus rearward motion of the plunger **38** is translated into forward and equivalent motion of the shuttle mechanism **50**.

While what has been shown and described is the preferred embodiment of the tank **10** those skilled in the art will no doubt appreciate that variations and modifications to the basic concept can be made without deviating from the invention in its broader aspects. That is to say that, the resilient members could be springs and the components could be manufactured of various shapes or materials which would perform the intended functions in similar or identical fashion but which would appear different in design. What is intended to be protected is included in the claims which follow.

What is claimed is:

1. An amusement vehicle having articulated multi-element tracks and a projectile feeding and dispensing system comprising; a chassis composed of a platform means including a pair of spaced parallel walls, a plurality of suspension arms each carried in trailing relation by a torsionally biased rotatable pin which extends normally through the middle portion of said walls, roller members each supported for free rotary movement in parallel relation to said walls at the arm end opposite said pin end for permitting controlled arcuate swinging motion of said roller members about said pin axis, idler means supported in parallel relation to said walls near the topmost section thereof for rotary movement, track means composed of articulated links hingeably interconnected along an elongated part of each for forming a chain loop to run about said roller members and said idler means as a pair of tracks each extending normally to one of said walls and said biased suspension arms acting to tension said tracks, resilient means connected between the said pins and said walls for urging each said arms carried thereon to bias said roller members carried thereby into engagement with the inner circumference of said track, a hollow enclosure supported for pivotal movement relative to said platform means for containing a projectile dispenser including an aiming device of tubular configuration having a companion plunger for permitting sliding mating inter engagement therebetween, force means connected between said plunger and said enclosure for selectively driving said plunger in said aiming device to propel projectiles therein through said device at increasing velocity, a supply means carried atop said hollow enclosure for containing

and feeding projectiles to said plunger aiming device when said plunger for same is drawn to a cocked position, interconnecting means between said plunger and a projectile transportation means carried for shuttled movements upon said supply means to push each projectile from the containing portion of said supply means along a feeding channel for receipt therefrom in the breech of said aiming device as said plunger is drawn to its fully cocked position.

2. The amusement vehicle of claim **1** wherein each said roller member includes a circumferential groove, each said articulated elongated hinged link include an inwardly extending pin normal to the center surface thereof such that said extending pin is arranged to cooperate with said groove as said track is moved or translates relative to and tangentially with respect to the circumference of said roller members during the forward or rearward movement of the vehicle.

3. The amusement vehicle of claim **2** wherein said idler means include at least one idler mounted upon an axis for fore and aft movement in a horizontal plane and said axis is biased in a direction which is radial relative to a portion of the inside curvature of said track means for tensioning same and said idler means includes a circumferencial groove adapted to cooperate with said pins for controlling the relative side to side movement of the upper portion of said track means as same is moved over said idler means.

4. The amusement vehicle of claim **1** wherein said interconnecting means includes a cable and pulley arrangement adapted to be connected to said plunger and said transportation means for movement of said plunger in one direction as part of said transportation means moves in an equal and opposite direction permitting said transportation means to feed a projectile into the breech of said aiming device only when said plunger is in its fully cocked position and said breech is open.

5. The amusement vehicle of claim **4** wherein said projectile transportation means includes a shuttling pawl which is adapted to carry projectiles in one direction only and is permitted to skip over immediately juxtaposed projectiles aligned in end to end relation whereby said projectiles may only be fed toward the breech of said aiming device.

6. The amusement vehicle of claim **1** wherein said torsionally biased rotatable pins include an arm on each connected to said pins where they extend through said walls and said arms carry a knob for supporting one end of a resilient member.

7. The amusement vehicle of claim **6** wherein each said resilient member is disposed between each said knob and an adjustable support carry on the inside of said walls whereby movement of said support is used to control the tension of said resilient member.

8. The amusement vehicle of claim **7** wherein said adjustable support is rotatably mounted relative to said walls and said resilient member is a closed loop flexible membrane whereby tension on said arms can be increased by rotating said support where it is connected to said member away from said arm.

9. The amusement vehicle of claim **1** wherein said force means connected between said plunger and said enclosure includes a flexible membrane for urging said plunger into said aiming device and said plunger includes resilient stop means carried thereon to damp the force expended by said force means.

10. The amusement vehicle of claim **9** wherein said connection between said force means and said plunger is adjustable relative to said plunger for controlling the initial tension of said plunger when same is in said aiming device.

* * * * *